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The Forests of Alaska.

THE great maritime forest of north-western North America, which at the south embraces the Redwoods of California and spreads over western Oregon and Washington, terminates on the Alaskan coast on the eastern shores of Kadiak Island, just below the fifty-eighth degree of north latitude. Taken as a whole, this coniferous forest is unequaled in productiveness and in the size, beauty and value of its trees. Not only is the Redwood the largest of all conifers, with the single exception of its relative of the Sierras, which excels it in bulk of stem and branches, but not in height, but in this maritime forest are found the largest Spruce-tree and the largest Hemlock in the whole world. Of the Arbor-vitæs here grows the giant of its race; and of all the Cypress tribe none can equal Lawson's Cypress in majesty of port. Here, too, the Alder becomes a great tree, and Firs assume their noblest proportions.

To-day, however, we would speak more particularly of that part of this forest covering the coast mountains of south-eastern Alaska, and which in many of its general features resembles the forests of Puget Sound and of western British Columbia, although the Douglas Spruce, the most abundant tree on the shores of Puget Sound and Vancouver Island where it surpasses all its associates in height and in size of stem, does not reach Alaska. The White Fir (Abies grandis), which is so conspicuous with its tall pyramids of lustrous dark green foliage on the shores of the Gulf of Georgia, is absent, too, from the Alaska forest, as is the Great-leaved Maple (Acer macrophyllum), abundant in all the coast region further south. The Arbor-vitæ (Thuya gigantea), which is common and of fine size on Prince of Wales Island and on the southern part of the Cleveland Peninsula, is rare, if it exists at all north of latitude fifty-six; and the coast forest of south-eastern Alaska is composed almost entirely of two trees, the Sitka Spruce (Picea Sitchensis) and Merten's Hemlock (Tsuga Mertensiana). From the edge of tidewater these two trees grow up to the timber line, which varies in elevation from 2,500 to 4,000 feet, everywhere in dense, serried masses, like the blades of grass in a meadow, covering all islands and the seaward slopes of the mainland mountains, which shut off the moisture from the dry interior. Sometimes the Spruces predominate, especially toward the north; sometimes the Hemlocks are more abundant, and often the two are mixed in nearly equal numbers. Through this forest the Sitka Cypress (Cupressus Nootkatensis) is scattered, usually at elevations of about 1,000 feet above the sea-level, although it often descends to the water's edge. It grows not in large bodies, but often in numbers sufficient to enliven the sombre Spruces and Hemlocks with the cheerful yellow tints of the graceful frond-like branchlets which descend from the wide-spreading branches of this splendid tree, unrivaled by any other American conifer in the beauty and value of its wood. On the margins of the little flats and beaches which occur only at the mouths of streams—for on the Alaska coast the mountains usually rise abruptly from the sea—Alders of two kinds and the lovely Sitka Willow light the borders of the forest; and Alders sometimes extend up the banks of streams or hang over rocky sea-cliffs. On sloping seashore bogs, rich in mosses and studded with many charming herbs and dwarf shrubs, Pinus contorta, the only Alaskan Pine, occurs rather sparingly; and on Baranof Island, near the town of Sitka, Patton's Spruce (Tsuga Pattoni), which is probably widely distributed over the coast mountains at high altitudes, descends with a few small individuals nearly to the sea-level. These, with the addition of the Balsam Poplar, which is only seen near streams, and the little Rocky Mountain Maple (Acer glabrum) are the only trees of the coast forest of south-eastern Alaska, which is remarkable in its poverty of species, in its richness in individuals, and in the size these attain in the thin soil, a few inches deep at best, and often on the nearly perpendicular slopes of these glacier-swept hills. They are wonderful, too, in the deep mosses of the forest floor, and in their impenetrable undergrowth of Blue-berries of many varieties, Salmon-berries, Menziesias, and the terrible Devil's Club (Panax horrida), which so cover the ground with their entangled stems that travel through the woods is practically impossible.

As compared with trees in forests further south, those of Alaska are not large, although Spruces and Hemlocks a hundred and fifty feet high, with trunks three or four feet in diameter, are not rare at the sea-level as far north as Baranof Island; ascending from the shore, however, the trees rapidly decrease in size and near the timber-line become small and stunted, as they often do at the sea-level at the heads of the numerous estuaries and fiords cut deeply into the mainland coast range.

The deepest and most interesting of these fiords, the Lynn Canal, a narrow continuation of Chatham Strait, extends a hundred miles northward from the coast nearly to the sixtieth degree, and at its head is fed by the waters of the Chilkat, the Chilkoot and the Skagway rivers, swift mountain streams, which afford difficult passage across low passes into the interior to the headwaters of the great western tributary of the Yukon. The forests at the head of the Lynn Canal differ somewhat from those in the region nearer the coast. The narrow bottom-lands are covered with masses of Balsam Poplar or with the so-called Green Alder, which here becomes a tree fifty feet high. The Spruce is still abundant at the river-level and on the lower slopes, but it is everywhere small and stunted. The Hemlock also occurs here, but only sparingly, and not of large size. The Pine is seen on the flats and at considerable elevation on the hillsides, but here its leaves are broader than those of the coast trees, and it is passing into the variety Murrayana of the interior plateau, the Lodge-pole Pine of our northern Rocky Mountains. A White Birch is very common at low elevations, and is more like the Birches of Siberia and northern Japan than any described American species, and growing with it is Acer glabrum, which is certainly the most widely distributed of all the North American Maples, and probably the most boreal member of the genus, and Patton's Spruce is at the timber line.

When these passes from the humid coast region to the dry interior are crossed an entirely different forest is encountered. The Hemlock and the Sitka Spruce have dis-

appeared, and the largest tree in the open scattered groves near the shores of Lake Bennett and Lake Linderman is a Fir (Abies lasiocarpa). With it grow stunted White Spruces (Picea alba), which in greater or lesser abundance and mingled with Balsam Poplars, Birches and Alders are scattered over the basins of the Yukon and its tributaries for hundreds of miles, and finally reach the Pacific coast on Kotzebue Sound within the Arctic Circle, and nearly five degrees north of Kadiak Island, where the forests of south-eastern Alaska give way to a growth of Grasses and low Alders and Willows.

Trees cannot be cut lawfully in Alaska for timber or fuel, for there is no law which permits the sales of stumpage or timber-lands, and no law relating in any way to the forest but the one which forbids all shipment of wood from the territory. There are a few sawmills in Alaska, however, and the number will soon be increased, and a large quantity of fire-wood is consumed at the salmon canneries and quartz mines, but the Government gets nothing for it, and is powerless to prevent damage to the public domain. Fortunately, the climate of south-eastern Alaska is so humid that forest fires are rare, and never very destructive, and reproduction is sure and rapid. These forests, therefore, even with American methods, will not soon or easily be destroyed; and here and to the southward along the coast ranges and islands of British Columbia through nine degrees of latitude from Cross Sound, at the north of Chicagof Island, to the Straits of Fuca is now the greatest continuous body of coniferous timber in the world, almost unmarked as yet by the axe, safe from fire and of easy access, from which the world will be able to draw great stores of material when the Redwoods and Douglas Spruces of the south have fallen, and our south-Atlantic and Gulf-shore pineries are only dim memories.

Pollen-bearing vs. Plant Vigor.

In Garden and Forest, vol. x., page 38, an article with the above title recorded some experiments made at Cornell University during 1895-6. Other researches and tests have since been brought to a close and have thrown some further light upon the subject.

The idea that pollen production is more or less an exhaustive process has gained many adherents who maintain that, because, in animals, differences favorable to man appear after the operations of spaying and castration, it therefore follows that, in plants, similar results will also appear if the plants do not have to produce both pollen and seed or fruit. In proof of this theory the favorite example cited is the case of the Strawberry, in which it is claimed, and apparently with justice, that the pistillate varieties are more productive than the so-called staminates or hermaphrodites, which, in addition to the production of fruit, also produce pollen. And this fact is considered sufficient to account for the lightness of the crop borne by the staminate varieties. But, as will be seen later, it is just as probable that the unproductiveness of these hermaphrodites is the result of the theory they are now cited as examples to prove.

Pollen production undoubtedly does demand much of the plant's energy since it has been ascertained by analysis that this substance compares in complexity of composition with the seed. De Planta, Przybytek, Famintzin and Snyder have found the following substances in various kinds of pollen: Water, globulin, peptone, guanin, hypoxanthin, amides, saccharose, starch, fatty acids, cholestrine, resinous and waxy substances, coloring matters, potash, magnesium, calcium, phosphorus, sulphur, chlorine, iron, aluminium and manganese in varying quantities. Snyder's analyses of corn anthers after the shedding of the pollen, show much the same substances to be present in these empty husks. It is, therefore, easy to believe that large quantities of plant-food are required to produce these parts. Snyder remarks that if we allow "corn to be planted three feet six inches apart each way, and three stalks to the hill" there would be 6.01 pounds of nitrogen alone per acre, "which makes the loss of nitrogen to the plant very considerable, equal to a very liberal application of nitrogen in the form of commercial fertilizers." But is this, strictly speaking, a loss? Has not the plant made provision for this apparent waste? These are questions that the experiments were conducted to test.

The primary office of pollen is to fertilize the ovules for the perpetuation of the species by seed. Since this fertilization depends upon such precarious agents as insects and the wind, plants which tended to produce even slightly more pollen than their fellows stood just that much better chance of perpetuating their characters—of having offspring. Allow this accidental trait to be perpetuated and augmented by heredity and the production of pollen becomes in time, as in the case of staminate dicœcious plants, apparently the sole object of its existence. But in countless cases pollen is borne by the individual which also bears the fruit apparently without lessening the production of the latter, and even though the proportion of pollen approaches the highest figures of the dicœcious males. Instances are recorded of Pine pollen being swept in quantity from the decks of vessels out of sight of land, and, again, of the beaches of our inland lakes and streams being yellowed by it. After many careful computations upon corn ovules and pollen grains, a writer finds that "allowing two ears of one thousand kernels each, to each plant (a very high estimate) there are still nine thousand pollen grains for every ovule to be fertilized." Darwin also records some interesting figures upon this point in his *Cross and Self-fertilization.*

The apparently great waste of energy in Corn-pollen production led to the apparently common practice in the last century of detasseling. This is recorded in *The New England Farmer*, 1797. Detasseling experiments have been tried at several of the experiment stations with contradictory results. In brief, it may be said that when the tassel was removed just as it appeared and before it had any chance to develop its pollen, there was sometimes a gain in the crop, but that when it was removed after the pollen began to shed there was no such gain.

Concerning the Strawberry so much has been said and written apparently without carefully conducted experiments, and by persons of more or less biased opinion, that the greater productivity of the pistillate varieties seems to be due to their sex, and even though the statements might be proved false, years would have to elapse before the popular mind could be shaken in its belief. After a careful compilation of all apparently reliable data obtainable from the various experiment-station reports and bulletins, it must be confessed that the pistillate varieties average higher than the staminates. This is found to be true no matter by what method the productiveness is judged, popular estimation, the scale of ten, weight or volume of crop, or of a certain number of berries. In only a very few instances do the individual staminates exceed the pistillates. These varieties are all of recent introduction. This excess never appears when a large number of each class are compared and calculated upon. Everything seems to warrant popular opinion. But it is believed that ever since Keens in England, and Longworth in America, impressed upon the horticultural public the importance of mixing hermaphrodite plants with the pistillate varieties to make the latter more productive, the staminate sorts have not had their due. The fact that the pistillates were productive when in proximity to the staminates was only a step to the theory that they were, per se, more productive, and that the ideal Strawberry must be a pistillate. It is true that the greater number of our more productive market sorts are pistillate, but it is interesting to note that the recently introduced staminates are close upon them. One reason that the staminates average so low is that a larger number of the old staminate varieties are retained than is the case with the pistillates, which are kept upon the move, so to speak. It is also true in this connection that the older

sorts in point of time have had greater chance to vary and deteriorate from their original type, due to differences in soil, culture and, as much as anything, to the different ideals of various growers. For example, the old Wilson as it originated probably does not now exist, if we may judge from the fact that of a number of samples of Wilson sent to Cornell Experiment Station a few seasons since, no two were enough alike to be called by one varietal name. It seems manifestly unfair to compare the old, run-out sorts, although bearing the original name and tracing their genealogy back to the original plant, with new, undeteriorated kinds. A comparison of old and new pistillate varieties reveals as great a range of productiveness as is found among the staminates. Hence the two classes should not be contrasted in the popular, unscientific manner since there is, after all these years of biased selection, no just basis for comparison.

In the experiments conducted at Cornell University all the plants were of as uniform development as possible, and in the cases where the plants were grown from cuttings, these were taken from individual specimens so as to reduce the factor of individuality to a minimum. The subjects were divided into three groups, as in 1896, the first blossoming naturally, the second suffering from emasculation in each alternate blossom, and the third being castrated in every flower.

The only annual which gave any results this season was the Alonzoa. The formation of its blossoms and its early and profuse flowering make it an exceptionally good subject to operate upon. The flowers may be opened and the stamens removed without injuring the development of the corolla. As with the Clarkia in 1896, the plants whose flowers were exsected produced several times more flowers and were more robust and vigorous than the non-exsected, while the "half-and-half" group was intermediate. Although practically even at the start, the exsected group had at the close a bushy development of axillary shoots which were covered with scores of tiny flower-buds. The natural group had hardly any of these side-shoots. It seems safe to conclude that Clarkia and Alonzoa find pollen-bearing an exhaustive process, and from these two cases we might further suppose that plants having a long period of bloom might show the effects of pollen production, while species with shorter blooming periods might, and probably would, show no effect at all.

Geranium and Nasturtium were the only cutting-grown plants which proved at all satisfactory. In each case the conclusions were much the same as given above. Nasturtium is a very useful subject since its stamens may be removed in a bunch with little danger of injuring the flower.

To summarize: Whether this production of pollen is the exhaustive process it seems to be, has yet to be proved. If it is exhaustive, it is reasonable to suppose that plants like the Corn, the Pine and others of their class would tend to reduce the amount of pollen produced and would expend their energies in other directions. On the other hand, it seems evident that the Strawberry has either found this process exhaustive and has thus tended to develop unisexual varieties, or that the increasing popularity of pistillate sorts as crop producers, which has presumably sprung from a misconception of the relative merits of the two classes, has led to biased care in selection—selection which has constantly tended to reduce the number of good staminate varieties at the same time augmenting the number and the attributes of the pistillates.

Again, if pollen production is exhaustive, it seems probable, as was stated above, that plants which have a long period of bloom would show the claimed evil effects very decidedly, whereas plants which blossom during only a short period and produce only a few flowers, would not show them. In other words, the minimum of evil should go with the minimum of blossoming both in time and quantity, and the maximum of depletion with the maximum of flowering. It is altogether probable, however, that if the process is depletive, it has been, is being, and will be answered by each species for itself, so that it will at no time exceed the plant's powers. By the law of natural selection, that species which would perpetuate itself must conserve all its force or become extinct.

Dept. of Agriculture, Washington, D. C. *M. G. Kains.*

Baron Von Mueller's Services to California.

MANY times since the death of Baron Ferdinand Von Mueller, the Australian botanist, I have regretted that his friends and correspondents in California did not long ago make some public and especial acknowledgment of his great services. It is true that these services were widely appreciated, and that he often received evidences of the affection he inspired, but the fact remains that his work for California was so remarkable that it deserves public recognition. If state legislatures were sensible of such benefits as Baron Von Mueller rendered this state they would take pleasure in passing resolutions to show their appreciation of this and similar services.

My own correspondence with this lovable man commenced more than twenty years ago, and continued at intervals until his death. In this correspondence the benefits were chiefly on one side, for the few notes upon plant-life that I could offer and the small collections of Pacific coast seeds that I occasionally sent him were unworthy of comparison with his lavish and thoughtful gifts. It was plain that he loved with all his heart to extend the culture of trees and plants and that he took a personal interest in each correspondent. It seemed, too, that he had acquired much knowledge of our California conditions, and felt himself responsible in some degree for the horticultural development of our state. In the course of a wide correspondence with botanists, collectors and various officials in different parts of the world, I may say that I have never met any person who was more unselfishly interested in the work of plant distribution.

Baron Von Mueller's interest in California matters led him to carry on a correspondence with several hundred of our leading florists, gardeners, nurserymen, collectors and amateur horticulturists. This correspondence extended through so many years and his letters were so invariably accompanied by packets of seeds that trees and plants from his distribution are now to be found in every part of California. Wherever one sees a plant which is not generally known he is likely to find, upon inquiry, that the seed came from Baron Von Mueller.

It would, of course, be expected that our older collections of Eucalypts and Acacias were largely created through his coöperation, but it is a surprise to find that he not only gave California its oldest specimens of leading Australian species, but that we received from him many species from south Africa, India and other parts of the world where he had correspondents. Under his management the Melbourne Botanic Garden became a kind of international clearing-house for the rarest seeds many years before they were common in the trade.

A list of species naturalized in California through the efforts of this one botanist would be much too long to print here. I believe, however, that such a list would include the leading Casuarinas, all our more valuable Atriplexes, many brilliant shrubs now comparatively common here, Araucaria Bidwilli, Aberia caffra, and fully fifteen species of Acacias and Eucalypts. I know of several fine Hakeas grown from seed sent by him many years ago. This summer Mr. G. P. Rixford, of San Francisco, after sixteen years of waiting, bloomed a noble Iris (I. Robinsoniana) from one of five seeds received from Baron Von Mueller. This plant is figured on page 255 of the current volume of GARDEN AND FOREST. Perhaps for years to come new species of plants will be arriving at maturity here, to strengthen our grateful memory of this old botanist.

In later years the Baron had a habit of placing certain favorite seeds in every consignment. All his packages, which once were rather conventional as regards appear-

ance, became more and more unconventional, until most of them utilized various kinds of empty tobacco bags. Not long ago I received a side light upon this subject from a much-traveled English woman, who said: "I was once for several days on a steamer with Von Mueller. He was going off to a camp in some wilderness and was dressed like a laborer. He sat on the deck all day, looking at the sky and ocean and smoking a little old black pipe, with tobacco bags in each of his pockets. He seemed very good-tempered, but he did not strike me as clever, though I heard he was a famous man."

A picture of the Baron in his Sunday best, decorated with medals of honor, hangs in the botanical department of the University of California, and a lovable face it is. But I like best to think of him in old clothes, smoking the little pipe, and going off into the wonderful Australian forests.

Niles, Calif. *Charles H. Shinn.*

Foreign Correspondence.

Nepenthes.

MR. HARRY J. VEITCH read a valuable paper on Nepenthes at the last meeting of the Royal Horticultural Society. A selection of species and hybrids was exhibited from the famous Chelsea collection, which for many years has been admittedly the best in England, if not in the world. Messrs. Veitch & Sons were the first among the nurserymen to collect these plants, and most of the hybrids now in cultivation were raised in their nursery.

Commencing with the history of the genus, Mr. Veitch traced the discovery of the various species. The first known was Nepenthes Madagascariensis, a comparatively unattractive species, which singularly enough was one of the last to be introduced, Messrs. Veitch having obtained plants of it for the first time in 1878. About thirty species are known and these are found principally in Malaya. The pre-Linnæan name for the genus was Mirabilis, Linnæus, who knew only N. distillatoria, renaming it Nepenthes, "Freeing from Grief," and stating that "if this is not Helen's Nepenthe it certainly will be for all botanists."

Nepenthes Rafflesiana was introduced to Kew in 1845. This was followed by the closely allied N. Hookeri, introduced by Messrs. Low & Co. in 1847. Then Messrs. Veitch sent a collector in search of Nepenthes, and various species were thus obtained by them. The discovery of four wonderful species in Borneo by Sir Hugh Low led to the preparation of a classical paper on Nepenthes by Sir Joseph Hooker, which was published in the *Transactions of the Linnæan Society* in 1859. A few years later these and other insectivorous plants were the subject of Sir Joseph's Presidential Address to the Linnæan Society, and this, with Darwin's work on the same subject, gave these plants an interest for horticulturists and for the laity which they have ever since maintained.

The four largest species are Nepenthes Rajah, N. Edwardsiana, N. Lowii and N. villosa. These are all wild on the mountain of Kina Balu, in Borneo, where, according to Mr. Burbidge, the natural conditions as regards temperature and moisture are somewhat peculiar. This may account for the failure of cultivators with three of these species. The only one successfully cultivated so far is N. Rajah, and this is only grown at Glasnevin, where Mr. Moore has always kept it in a cool house along with Masdevallias. A pitcher taken from his plant, shown by Mr. Veitch, astonished everybody by its size, vigor and rich colors; it would probably hold a pint of water. Another species, N. Edwardsiana, has pitchers twenty-two inches long and capable of holding two quarts of water. The size of these pitchers can be understood when it is stated that a drowned rat was found in one of them by Sir Hugh Low.

By the year 1872 ten species of Nepenthes had been successfully established in gardens here and four hybrids had been raised. The first of these was Dominiana, raised in Messrs. Veitch's nursery in 1862. The introduction of N. sanguinea, N. Veitchii, N. Curtisii, N. Burkei and N. Northiana has added considerably to the popularity of the genus, and as numerous hybrids have been raised from these the variety of pitchers has been greatly increased. The best of all hybrids is N. Mastersiana, raised by Messrs. Veitch & Sons from sanguinea and Khasyana. It is easily cultivated, is dwarf in habit, pitchers freely, and the pitchers are large and of a dull crimson color. Next to this come N. mixta and N. Dicksoniana, the latter a hybrid between N. Rafflesiana and N. Veitchii. N. Morganiæ, a hybrid of American origin, is also highly appreciated here.

There are, according to Mr. Veitch, over forty hybrids enumerated, but some of these are merely variations of the same hybrid, much variation being shown by plants out of the same batch of seedlings. It is probable also that some of these so-called hybrids have been obtained by crossing varieties with each other. The introduction of N. Northiana was due to the enterprise of Mr. Veitch, who on seeing in 1880 a painting of it which Miss North had made from a plant brought to her by a native when in northeastern Borneo, obtained particulars from her and despatched a collector for it. He found it growing below the ledge of a cliff and succeeded in getting home seeds of it. Mr. Veitch says it has proved one of the most tractable of the Nepenthes under cultivation and one of the handsomest. A recent introduction from the Seychelles, namely, N. Pervillei, was exhibited from Kew, where it has been raised from seeds. It is remarkable for the length of the pitcher-stalks and for the elegance and rich coppery-red color of its pitchers. This species has always been a special desideratum with botanists as well as cultivators, and it has taken twenty-five years to get it successfully introduced. Plants of Nepenthes rarely recover from the effects of a long ocean voyage, while the seeds are so easily damaged that one may try time after time and fail.

The seeds ripen in about three months after fertilization, and germinate in about six weeks. The first leaves after the cotyledons invariably bear tiny pitchers. Some species are said to bear only tiny pitchers and no leaf-blade when young. With good treatment plants twelve months old have leaves four inches long and pitchers an inch long. The stronger-growing sorts grow from three to four feet in a season and produce from twelve to eighteen pitchers. The best pitchers are produced by basal shoots or short plants, and for this reason cultivators prevent the plants from making long shoots by pinching the tops out of them when about a foot long. If allowed to grow the stems will attain a length of twenty or even thirty feet. The pitchers developed on long stems are smaller, narrow at the base and less highly colored than those on short stems. There is not much variation in the leaf characters of the genus, some being longer and narrower in the blade than others. They are all strap-shaped, leathery in texture, green, and the pitchers are suspended on stalks formed by the prolongation of the midrib of the leaf. This stalk performs the duties of a tendril, twisting round a twig in precisely the same way. By this means the plants in a wild state succeed in climbing up into sunlight. It is noteworthy that the species which produce the largest pitchers grow at a high altitude where the conditions are subtropical or even temperate. According to Mr. Burbidge these species are always terrestrial, comparatively short in stem, and their pitchers usually rest on the ground. The same authority stated that in Borneo these plants are known as Monkeys' Cooking-pots and that the natives drink the liquid found inside the pitchers before they open, as a cure for indigestion. All the species are insular in habitat, and they are mostly local, the exception being Nepenthes gracilis, which is found all over Malasia.

The following selection of species and hybrids represents what are here considered the best for the garden: Species: Burkei, Curtisii, distillatoria, hirsuta, Northiana, Rafflesiana, sanguinea and Veitchii. Hybrids: Amesiana, Dicksoniana, Mastersiana, mixta, Morganiæ, Sedeni and the new Tiveyi. This last was shown for the first time

Fig. 49.—Rhus trichocarpa.—See page 384.

1. A flowering panicle, natural size. 2. A fruiting branch, natural size. 3. A staminate flower, enlarged. 4. Stone of a fruit, enlarged.

this week by Messrs. Veitch. It is named in compliment to their grower of Nepenthes, Mr. Tivey. It is a hybrid between N. Veitchii and N. Curtisii, and resembles the latter, but the pitchers are paler in color and have the wide rim of those of N. Veitchii. It was awarded a first-class certificate.

London. *W. Watson.*

New or Little-known Plants.

Rhus trichocarpa.

RHUS TRICHOCARPA* (see illustration on page 383 of this issue) is a slender tree frequently twenty-five feet in height and a native of Japan, where it is a common forest plant in Yezo and in the mountain regions of central Hondo, where it also often springs up in hedgerows. The leaves are eighteen or twenty inches long, unequally pinnate, with dark red-purple midribs and usually thirteen broadly ovate, long-pointed, short-stalked membranaceous leaflets, hirsute below, especially on the stout midribs and primary veins, from three to five and a half inches long and from an inch and a half to two inches wide. The flowers are produced in narrow erect panicles, appearing in early summer, and are soon followed by the pale prickly fruit borne in loose drooping clusters. The habit of this tree is not particularly good, and its flowers and fruits are not attractive, but in the autumn it lights up the Japanese forest with splendid tints of orange and scarlet which are not surpassed in brilliancy by those of many other plants. Introduced into the Arnold Arboretum five years ago, Rhus trichocarpa has proved perfectly hardy up to this time in eastern Massachusetts, and this year has flowered and produced its fruit for the first time. *C. S. S.*

Cultural Department.

Raspberry, Bunyard's Superlative.

I WAS surprised to find two years ago how good a fruit this is as grown in English gardens, and was at once ambitious to try it in the conditions of our New England climate. A hundred young canes were obtained and these we have fruited in the past two seasons. We are satisfied that there are few, if any, Raspberries to equal this for size and flavor. This impression also finds favor with Messrs. Ellwanger & Barry, who have about 40,000 plants of this Raspberry in their grounds, soon to be distributed. The canes are very stout and rigid, so that no staking seems to be required; the berries are abundant, and so large that they are often coxcomb-shaped like some strawberries. The fruit bears transportation better than that of many of the smaller varieties. Messrs. Ellwanger & Barry assure me that this variety is as hardy as any they grow, and much hardier than some others of native origin. This statement is reassuring, for we have covered our canes with earth each winter to make sure of them, as is necessary in this section with all the other varieties to obtain a crop. Many kinds are under trial here to find out which is the best. We have most interest in a lot that are the result of two large berries taken when ripe in the summer of 1896, rubbed out in fine dry sand and sowed at once. The seed pans were frozen early last winter and brought into warmth the beginning of the year, when the seeds at once came up. From this seed we have now more than two hundred fine young canes, averaging four feet in height and still growing. These plants, we think, are the result of a cross between the Cuthbert and Superlative Raspberries, as these two kinds grew together and bees were plentiful. Great variation is apparent in the habit of the seedling canes, and we shall watch with interest their fruiting next summer. There is yet much scope for improvement in Raspberries; none are hardy enough, the habit of many, especially the new Columbian, is very distressing when one has to pick the fruit, and afterward when the new growth is so far advanced as to become prostrate.

As already stated, Raspberry canes require protection in this section by laying them down and covering them with earth in the fall. One season the frost came early and continued, and the canes could not be laid down in the usual way. Loose straw litter was strewed over them after they were laid on the level. This plan was only tried once, as the field mice congregated apparently from the whole county, and in spring not one cane was left ungirdled. There were no Raspberries that summer.

South Lancaster, Mass. *E. O. Orpet.*

The Cultivation of Cannas.

IT is interesting to look back a decade and note the progress made in the cultivation of Cannas. The development of the Crozy type, from which almost every high-class variety has come, is most interesting. In no class of plants can less credit be claimed by the hybridist, for the best Cannas have resulted from careful selection. The arrangements for close fertilization are so complete that it is almost impossible, if fecundation is secured, to thwart Nature. It was predicted when the large-flowered giants of the Flaccida type, Italia and Austria, were introduced that they would supersede the Crozy type. Both these types are continuous bloomers, but what is lacking in the blooms of all Cannas, durability of texture, is still more lacking in the Italian varieties. The flowers are extremely fugacious, and what I have seen of the half a dozen or more new colors in this section they all have the same defect. The American variety of this type, the Burbank, is no better in this respect; in appearance it resembles the variety named Austria.

As pot-plants for foliage effects Cannas are highly effective, and under glass, with shade, the flowers are more durable. This is true of all Cannas; under glass the flowers have better individual development and last long enough to fill out a good round truss. Canna specialists hesitate to judge a variety by its behavior under glass; the supreme test is out in the open air. Paul Briant is superb under glass, but of little use under direct sunlight. For a bedding Canna a compact truss is a strong recommendation. Among medium growers, Queen Charlotte and its "improved" variety are the finest. The flowers are widely banded with yellow and durable. An effective combination in a circular bed may be made with plants of Queen Charlotte in the middle and Mrs. Fairman Rogers, a fine form of the Crozy type, as an edging. Mr. Denys Zirngiebel, of Needham, Massachusetts, who makes a specialty of Cannas, considers President Cleveland, a salmon-scarlet, the finest bedding Canna of its color yet introduced. It is very compact, and in vividness of coloring it outshone all others in a large patch containing sixty varieties. It was raised by Mr. Pfister, gardener at the White House. This list comprises scarcely half a dozen first-class varieties, if the dark-leaved sorts are excluded. Bismarck, a recent variety, showed up well; it has a dwarf habit and compact and full-flowered truss of crimson flowers. Robert Christie is a beautiful salmon-red and a splendid pot-plant; Ami Pichon is a good maroon with deeper spots; Leonard Vaughan is a fine dark-leaved kind with scarlet flowers; J. D. Cabos has orange-scarlet blooms; President Carnot has luxuriant foliage.

Wellesley, Mass. *T. D. Hatfield.*

Notes on the Orchid-flowering Cannas.

WE have been greatly interested in the new Orchid-flowering Cannas since their first announcement, and have taken some pains to grow most of the varieties offered for sale. A note regarding the variety America was sent to Garden and Forest some weeks ago (see vol. x., page 178), and a completer account has been more recently published in the *Tenth Annual Report of the Vermont Experiment Station*, page 119. Since that report went to press we have brought two new varieties of these Cannas into blossom. These are Bavaria and Burgundia, both from the lists of Dammann & Co., the originators of Italia, Austria and America.

We are somewhat disappointed in these two newest varieties, not because of bad qualities, but on account of their close resemblance to Italia. Italia is a beautiful Canna, to be sure, perhaps the best one of this class yet introduced, but Burgundia and Bavaria are so much like it that a careless observer would pass them by as all of the same kind.

Both varieties are, however, of smaller stature than Italia and have smaller foliage. The flowers in all three are of a brilliant canary-yellow upon which two shades of rich apricot-red are successively overlaid. In Italia the red colors are run together in the throat to make somewhat regular solid blotches bordered with very deep bands of the clear yellow, like an exaggerated Queen Charlotte. In Bavaria there is very little of the darker red shade, while the lighter red is scattered in small dots well out upon the petal-like staminodia, giving an effect more like that of Florence Vaughan. Burgundia is almost a medium between Bavaria and Italia, with more of the dark

* Miquel, *Ann. Mus. Bot. Lugd. Bat.*, II., 84 (1865) (*Prol. Fl. Jap.*, 16).—Franchet & Savatier, *Enum. Pl. Jap.*, I., 93.—Engler, *De Candolle Monogr. Phaner.*, IV., 379.—Sargent, *Forest Fl. Jap.*, 34.

overlying red than the former, and more of the leopard spottings than in the latter. Burbank, the only variety of American origin yet advertised, does not seem to have been noted so much in the horticultural press as its good qualities deserve. It is the equal of the Italian varieties. The flowers have the form of Italia and nearly the coloring of Austria. That is to say their form is the best, and their coloring pure canary-yellow with a few faint reddish spots in the throat.

These new Cannas, hybrids of Madame Crozy with C. flaccida, are especially admirable for two qualities, namely, the perfection of form and the richness of color in their blossoms. The type of Canna-flower which we are used to seeing among the French dwarfs, when taken by itself, is singularly inharmonious and unsatisfying in its outlines, but there is a fullness of form and grace of outline among the Orchid-flowering sorts which by comparison is altogether pleasing. Their richness of coloring is remarkable. The comparative size of the flowers has been considerably overstated in the advertisements. They are quite large enough, to be sure, but they are only a little larger in fact than Charles Henderson, Alphonse Bouvier, or dozens of other old and well-known varieties.

Several of these varieties we have had this year in quantities sufficient for liberal use in outdoor beds. Their large, luxuriant, Musa-like foliage is quite effective, but there is a noticeable paucity of flowers in comparison with the older French dwarf sorts. The softness and flaccidity of the blossoms detract somewhat, of course, from their usefulness out-of-doors, but not so seriously as we had expected. The flower-spikes, though comparatively few in number, are fairly durable and effective as far as they go.

The Orchid-flowering Cannas—and, by the way, they ought to have a better class name—are certainly attractive novelties for the amateur, but in their present state they are not likely to find great favor among professional gardeners, who are interested chiefly in gaudy red and yellow floral effects.

University of Vermont. *F. A. Waugh.*

[The Italian hybrids noted grow strongly in this latitude, their principal defect being that their flowers scorch under our summer sun, and they are for this reason not as effective as the size of the flowers would indicate.—ED.]

Hot-house Palms.

AMONG the Palms which require a warm temperature, Stevensonia grandifolia is one of the handsomest. It is most attractive when the plants are from two to eight years old. There are apparently two distinct forms of this species, one has leaves uniformly green, and in the other form they are dotted with a reddish yellow color.

Pinanga Kuhlii is a rapid grower and reaches the fruiting stage in about four or five years; so far as I know it is only exceeded in this respect by Geonoma fenestrata. P. Kuhlii must have a moist, warm atmosphere. The leaves are quite large, with from eight to fifteen pairs of irregular pinnæ. The fruit is rather ornamental, at first yellow, changing to a dark purple when ripe. Old plants send out growths from the base of the stem. This is a desirable species for planting out in a conservatory.

Hyophorbe amaricaulis is pleasing when young, and the same may be said of H. Verschaffelti. It is difficult, however, to keep them in good condition when they become a few feet high. The last-named species was very popular twenty years ago as a decorative plant, but has been displaced by the Kentias and by Areca lutescens.

Acanthophœnix crinita and the variety Herbstii are neat-growing, small-sized Palms. The leaves are pinnate, the pinnæ arching toward the ends. This species suffers quickly if the soil in which it is growing is allowed to become dry.

Ceroxylon niveum, one of the Wax Palms, can scarcely be said to be ornamental when young, for the leaves are coarse and undivided. As it grows, however, it becomes highly ornamental. The long, feathery leaves are grayish green. Although it will thrive in the temperature of an intermediate house, it puts on a more graceful appearance when given stove temperature.

Latania Commersonii has immense palmate leaves, and is only fit for botanical collections.

Livistona Jenkinsii is an Indian species of great beauty when a few feet high. In young plants the leaves are irregular in shape; in adult plants they lose this peculiarity. The leaves have a bright, almost emerald-green color not found in any other species of Livistona. L. rotundifolia resembles L. Jenkinsii somewhat, but is smaller in all its parts. In young plants the leaves are closely arranged together with short stalks; the leaf-blades are completely round, with about sixty divisions. This Palm is rapidly becoming popular as a decorative plant and is being largely grown by some dealers.

Licuala grandis is cut up in the ends of the leaves for a short length, thus giving the plant a fuller, rounded appearance than that of other Fan Palm. It needs a hot, moist atmosphere or it is liable to become infested with red spider.

Calamus Lewisianus, C. fissus and C. palembanicus are ornamental Palms with graceful pinnate leaves. They are only suitable for conservatories with plenty of head room, as they grow tall.

Arenga saccharifera has immense pinnate leaves of a dull green color. It is only useful in large houses.

Euterpe edulis is probably the handsomest of all the feather-leaved Palms, and should be in every collection. It has the same habit of growth as Seaforthia elegans, but the leaves are smaller and more compact. Plants fifty feet high have stems only a few inches in diameter.

Botanic Garden, Washington, D. C. *G. W. Oliver.*

Notes on Propagation.

MANY tender foliage plants make their most rapid growth during the latter part of the summer. The root-action of the parent plant is then free; it is therefore easy to root cuttings. For example, Crotons can be rooted easily at this season by using the topping method, frequently practiced for Ficus. This method is the most satisfactory one for strong and highly colored growths, from the fact that little or no foliage need be lost, as may be the case when a strong and sappy growth is at once removed from the parent plant for cutting purposes. Large Dracænas may also be similarly topped with the loss of but few leaves, and the young plants thus secured have the advantage of large leaves at the bottom and make more symmetrical specimens for the next season. Old plants of Yucca quadricolor that have become unsightly from the loss of their lower leaves may also be renewed by topping. For these plants it is advisable to nick the stem quite deeply, and the bandage of moss used need not be kept quite as wet as is necessary for Crotons or Dracænas. After the removal of the top from an old Yucca the stump may be kept rather dry for a time to avoid decay, when other breaks will appear and furnish new stock, in addition to the suckers that are likely to show from the roots.

Cuttings of such easily managed plants as Sonerilas, Bertolonias and Fittonias may be rooted at almost any season, and it is not too late now to increase the number of these plants. The most effective way of using low-growing plants of this character is to group a number together in an eight or ten inch pan filled with a rather light and well-drained compost.

Small side-shoots of Cyanophyllum magnificum and Sphærogyne latifolia make satisfactory cuttings, which should be kept rather close and warm in a propagating-frame to insure their rooting. The best medium for rooting them is a mixture of cocoa-fibre and sand. Single-eye cuttings of these plants also root readily, but do not always make as shapely specimens as the side-shoot cuttings, and sometimes refuse to start away promptly. A well-colored specimen of the Variegated Pine-apple is among the most effective of stove-plants. The crown of a fruiting plant provides the best cutting material, and will root freely in pure sand if placed in a light position in a warm house and given but little water. Young plants may also be secured from sections of the stem of a rather leggy specimen. These sections should have the cut surfaces dipped in slaked lime to prevent decay, and then be half-buried in sand and treated like top cuttings.

Pandanus Veitchii has no special season for propagation, but cuttings planted in cocoa-fibre will root quickly during the latter part of the summer and early fall. The cuttings should be kept somewhat dry.

The propagation of Nepenthes is comparatively easy in a warm propagating frame; the only exception to this rule is found among those species having hirsute leaves, of which N. lanata and N. villosa are types. Small, short-jointed side shoots of Nepenthes are the best cuttings and usually produce the finest pitchers. An open mixture of rough peat and sphagnum moss is the best material in which to root them. The cuttings must never become dry, for once wilted they seldom recover.

Success in the propagation of tender species depends also upon the after treatment of the newly-rooted plants. In most instances the safest plan is to return the young plants to the cutting frame for a week or two after they have been potted off and gradually give them more air as the roots become

established in the new soil. They should finally be removed to permanent quarters as they begin to grow. These details of management are, however, the most difficult lessons to learn in the work of propagating.

Holmesburg, Pa. *W. H. Taplin.*

Sternbergias.

STERNBERGIA MACRANTHA, which was reported last year as flowering much later in the season, opened its first flower in the middle of September, and its blossoming time is evidently about that of S. lutea, which is now in full bloom. S. macrantha, as its name indicates, has a large flower about twice the size of that of S. lutea, but one misses the foliage which only appears in late winter, and unless S. macrantha is grown under a mat of some low-growing plant it misses much of its effectiveness. This species was collected a few years ago by Mr. Whittall, who introduced it to cultivation.

Sternbergia lutea, which has a strong tradition of being the Lily of the Field, is certainly one of the most cheerful and attractive of the low-growing small flowers. The common name of Winter Daffodil is not as inapt as popular names often are, for it somewhat repeats the spring effect of yellow Daffodils, with golden-yellow flowers and plentiful foliage to enhance its charms. The flowers show their full charms only to the sun.

Elizabeth, N. J. *J. N. Gerard.*

Calochorti in a Southern California Garden.

DURING the past season I have had much pleasure in cultivating Calochorti in the garden. In a good collection the season of bloom here continues from the first of March to the middle of July. The first species to open is C. Catalinæ, with large white flowers, shaded lightly with purple on the outside and with deep wine-colored spots at the base of the petals. It continues in bloom for two months. A rare and lovely form is C. Catalinæ alba, with pure white flowers and no trace of purple, but small yellow spots at the base of the petals. C. Catalinæ is in flower for two months. Before it is done C. clavatus appears, and this, in my opinion, is the finest of all the yellow-flowering kinds. A year ago I wrote to Garden and Forest (see vol ix., p. 249) in praise of C. luteus concolor. I have since found that I was in error and that the plant described was C. clavatus. These flowers are often four inches in diameter, of the richest golden-yellow, with rich brown markings in the centre. Occasional plants bear pure yellow flowers. The plant is robust and easy to grow in any soil. About the same time flowers of C. venustus and its varieties appear. C. venustus roseus has charming pink flowers. Some of the venustus El Dorado varieties are fine, and one having rich wine-red flowers was conspicuous.

Even here the desert species are difficult to grow outside of their habitats. My best success with Calochortus Kennedyi was in boxes of decayed granite soil brought from the mountains. The flowers of this species are unique in color, being of the richest orange-scarlet, with purple spots in the centre. C. Weedii and C. venustus citrinus bear interesting flowers, but they cannot compare in beauty with those of C. clavatus. The last species to bloom is C. Plummeræ; the flowers are large, in color rich lavender-purple and lined with yellow hairs. It continues in flower quite into July. C. luteus, C. albus and C. amœnus are interesting, but to my mind not so fine as the true Mariposa Lilies.

Los Angeles, Calif. *E. D. Sturtevant.*

Correspondence.

Notes from Missouri.

To the Editor of Garden and Forest:

Sir,—After favorable weather in spring and early summer throughout this section came the unwelcome change of a drought, and week after week the earth was scorched. The dust was bottomless and the meadows have been brown as in winter. Here and there on rocky hillsides great patches of trees are apparently dying, and every leaf hangs crisp and sere from the shriveled twigs. Early in September I noticed Peach and Pear-trees growing in thin, hard soil, with the fruit actually shriveling upon the trees. Should this drought be followed by a severe winter thousands of fruit-trees in this state will die, for experience has repeatedly demonstrated that imperfectly developed and prematurely ripened wood has low vitality; seasons such as this are vivid object-lessons, showing the need of extra care in planting.

Vegetation has by no means suffered alike. Flowers, vegetables and young trees planted in ground that was well prepared found encouragement for early and deep growth; while these have languished, they have borne the drought well and have attained fair development. Trees that have been pruned and mulched, and in the case of fruit-trees, had the fruit thinned so as not to tax the tree's vitality, withstood the trying heat well. In the third week in September we picked pears, peaches, grapes and apples of fair size and smooth and free from blemish. A popular belief exists that it does not pay to grow fruit extensively in a climate subject to drought. It is more reasonable to protest against neglecting fruit-trees in a country liable to dry summer seasons. Nature has given this south-western country a soil and climate peculiarly adapted to the production of large and highly-flavored fruit. Even in this drought I have seen peaches half of which would not go through the mouth of an ordinary Mason fruit-jar, and in favorable seasons pears weighing twenty-two ounces and plums measuring six inches in circumference have been grown here. But such fruit does not grow promiscuously. Overcropped trees, or those left to the mercies of the apple-borer and codling moth, give but common fruit in the most favorable seasons; in trying seasons such as this they are all but failures. Our most productive Pear and Plum-trees are mulched, and I believe this care pays in dollars and cents.

The flowers at Oak Lawn withstood the dry heat remarkably well. A threatened failure of water-supply cut off the use of the hose except for a few potted and special plants. The closely shorn sward of the lawn has been distressingly brown, and the contents of several flower-beds have succumbed. Nevertheless, there are many plants yet in full bloom, even where the sun has shone fiercest and hottest. I can account for it in no other way except that the beds are deep and mellow and the plants have grown large enough to shade the ground and prevent surface evaporation, while their roots have struck deep enough into the earth to find moisture. Roses, Cannas, Cockscombs, Phlox, Snapdragons, Dahlias, Petunias, Portulacas and Marigolds have done best among flowering plants, though a score more have given a few scattering blossoms. Vines of all kinds have been unusually luxuriant, and Passifloras, Manettias, Ipomœas, etc., have flowered luxuriantly. My experience is more and more in favor of vines, shrubs, perennials and tuberous plants for ornamental purposes in countries subject to dry weather. Annuals and bedding plants should be planted in situations which are in shade a part of the day or in the shelter of some building. Double the display of flowers may be had for the same expenditure of labor and money if good judgment is used in selecting and planting.

Pineville, Mo. *Lora S. La Mance.*

A Missouri Fruit-farm.

To the Editor of Garden and Forest:

Sir,—The Olden Fruit Farm, to which reference was made last week in my notes from the Ozark region, now comprises three thousand acres. This tract was mostly virgin soil, and covered with the native tree growth which is largely made up of Black Jack Oak, when the farm was established between thirteen and fourteen years ago. But it also includes several outlying farms of much older origin, all of them having Peach and Apple orchards, some now thirty years old. The condition of these orchards aided Colonel J. C. Evans, the experienced fruit grower, who founded the "greater Olden Fruit Farm," and who still controls it, in deciding on a suitable location for his enlarged enterprise. This large farm takes its name from a pioneer fruit grower named Olden, who owned the old place that became the nucleus of the present great undertaking.

Altogether there are 105,000 Peach-trees on the place. Among the large proportion of Elberta trees there is one block of 12,800 trees of that popular variety. Of these about 75,000 are in bearing.

The average expense of starting a new Peach or Apple orchard is given by Superintendent Mosely, of the Olden Fruit Farm, as follows: Cutting off the trees, known locally as slashing, $3.00 an acre; clearing and burning, $1.00; grub breaking, $3.50; picking and burning stumps and roots, $2.50; stock, $7.00, or about four cents apiece for either Peach or Apple-trees.

Peaches are invariably set on the highest ground in the Ozark region, as the position largely exempts them from the danger of late spring frosts. Apple orchards occupy the dipping intervales. In many orchards Peach and Apple-trees are set alternately, with the idea that the Peach-trees will have reached the limit of profitable bearing by the time they crowd the Apple-trees. But this plan is neither followed nor approved on the Olden farm, where that limit is not yet estab-

lished, for the thirty-year-old trees on the old, original farms still give profitable crops as regularly as the younger trees. Corn is grown between the fruit-trees. This crop, which averages twenty-five bushels to the acre, is fed to hogs, and this proves the most profitable way to occupy the ground while the orchards are maturing. It is stated that at least one carload of hogs is shipped from the Olden farm every week in the year.

This farm is well equipped for utilizing its enormous fruit crop. Large shipments of fresh fruits are made by rail daily, and there is a small but complete canning plant with a capacity of 5,000 cans a day, the output of which it is expected will this year reach 50,000 cans, or eight carloads. There is also a modern distillery with a capacity of twenty barrels a day, where all surplus or inferior peaches and apples are made into brandy of the highest grade, and where the entire crop from forty acres of Blackberries is also consumed.

The red, gravelly soil of the Ozark fruit region looks unpromising in itself, and it is in many places closely covered with a really forbidding and formidable covering of rocks or stones, ranging in size from that of an egg to a loaf of bread. These do not seem to interfere greatly with plowing, as the stones are seemingly all on the surface and slide to one side. They are considered an actual advantage to the orchards in that they act as a mulch, and keep the ground cool and retain moisture near the surface. Both orchards and crops on the soil so mulched endure drought better than on ground that is free from stones.

Brighton, Ill. *Fanny Copley Seavey.*

A Wet Season.

To the Editor of GARDEN AND FOREST:

Sir,—A wet season affords a special opportunity to note the differences and the compensations of various soils and situations. In every place of any extent, especially where the surface is varied, there is some variety in this respect. Skill in adaptation will show a surprising effect in the results. It is the taking advantage of these slight helps that may mean success or failure. Walking about the grounds of a friend this summer I came upon a broad sheet of Forget-me-nots, which filled a hollow near the outlet of an attractive little pond, used for supplying ice. My friend explained that she had tried to establish a large bed of Myosotis in her garden three times and failed; then this spot was selected and proved a place where the plants were perfectly at home, and they grew and flowered and spread with the utmost luxuriance.

Flowering and fruiting plants that require a large supply of water and those which resent an excess of water are clearly differentiated in a season like the one just closing. From notes taken in a garden of fruits and flowers, which includes four or five acres of varied surface, both the gains and the losses of such a season appear.

Perennials generally have done only moderately well. Hardy Chrysanthemums, perennial Phloxes and some others have mildewed badly. Annuals, on the contrary, have given profuse and persistent bloom. Shrubs have made unusual growth. Out of a tolerably full collection of the most reliable hardy shrubs, set within five years, only a small proportion made satisfactory growth during the three preceding dry summers. But with liberal mulching the roots have done better than the wood, apparently, and this year the copious rains have induced a rapid production of vigorous shoots.

Vegetables, especially root crops, succeeded well in a soil naturally light and dry.

Early peaches rotted so badly this year that an almost total loss of the large crop is the result. Late varieties did well.

Details vary, and everywhere the gardener who looks for lasting results needs to study the capabilities of the actual situation, but the suggestions of a wet season may be turned to account in a dry one, if there is at command that most important auxiliary, an adequate and easily controlled water-supply.

Amherst, Mass. *D. H. R. Goodale.*

Insects in the Garden.

To the Editor of GARDEN AND FOREST:

Sir,—In passing a fine specimen of the rare and beautiful Yellow-wood I was surprised to note that it was badly attacked near the ground by what appeared to be some relation of the Locust-borer. I have frequently thought that we shall have to make the destruction of insects as regular a part of systematic gardening as the destruction of weeds. At present there is little account taken of insects by most owners of gardens. Rotten peaches are seen, but it never occurs to the grower to look inside for the larva of the curculio ready to emerge. The damage is supposed to be the result of something mysterious, and perhaps some editor is written to for a solution of the puzzle. We may go into one of many gardens and see the leaf-worm at work before the owner's eyes, who is in utter ignorance that an insect is on hand. It is not uncommon to see beautiful and rare evergreens utterly destroyed by this curious and active creature. In some seasons certain insects are more damaging than others. This year the red spider has been singularly destructive of evergreens, and the honey aphis of Norway Maple and other trees. We have learned to know a weed when we see it, not, perhaps, that we know much about it, but because it is something out of place, and sooner or later a knowledge of injurious insects will also have to be a regular part of the education of every good gardener. Trees and plants should be examined systematically, and the work of annihilating these pests will not be found difficult when the task is begun in time and pursued intelligently.

Germantown, Pa. *Thomas Meehan.*

Recent Publications.

The Water Garden, embracing the construction of ponds, adapting natural streams, planting, hybridizing, seed-saving, propagation, building an aquatic-house, wintering, correct designing and planting of banks and margins, together with cultural directions for all ornamental aquatics. By William Tricker. New York: A. T. De La Mare Printing and Publishing Company, Limited.

Nymphæas may or may not "have existed for all ages," as stated in this attractive book, but there is no question that for the last decade or so they have been much appreciated in gardens, public and private. It is also a fact that no form of horticulture meets with such universal appreciation as the water garden. The largest displays of the showiest or rarest flowers have cold appreciation from a large portion of the public, but there is a charm about a water garden with Nymphæas floating on the placid waters which reflect each passing cloud, and attract so many busy visitors of the bird and insect worlds, that fascinates the most careless observer. Nymphæas being of the easiest possible culture, there is no reason why they should not be grown in the smallest gardens as well as on large estates.

Mr. Tricker has been actively engaged in the growing of aquatic plants during the time when they have most rapidly gained in popularity, and perhaps no one has had a larger experience with Nymphæas of all kinds under cultivation. As will be noticed by the title, this manual is concerned with the practical side of water gardening, the details of which are treated fully. The making of tanks and artificial ponds and the adapting of natural waters to Nymphæa culture are all explained, as is also the handling and propagation of the plants. As to the planting, full details are given with extended lists of varieties, with the lack of perspective usual to such lists. The plant world is full of material in every section. What the intending grower wishes especially to know in starting any new culture is, which are the few best things most probably satisfactory for a beginning. A short list of this kind sharply drawn would be helpful to the increase of water gardens among the readers of the book. Aquatic plants under conditions of ample moisture and warmth grow so rapidly as to require care in selection and planting. As Mr. Tricker says, "overcrowding should be avoided, and everything cannot be represented on the borders of one pond," though we regret to say that some of his well-executed pictures of examples do not bear out his advice, overcrowded and spottily planted borders being sometimes conspicuous, instead of the broad, quiet effects more appropriate in such places. The pictures in the main, however, are suggestive of handsome effects, are well executed, and, like the book, are well printed; and *The Water Garden* is a most useful, suggestive and valuable manual for any one interested in horticulture.

Notes.

Charles J. Dawson, a son of Mr. Jackson Dawson, for many years head-gardener in the Bussey Institution of Harvard

College, has joined the staff of the Boston Park Department as chief of the Planting Division.

The first carload of California raisins for the season of 1897 was shipped from Fresno in that state on September 3d.

The hops in this state and on the Pacific coast are now all picked. Estimates of the yield in New York place the crop at from fifteen to twenty-five per cent. smaller than that of last year, and it is said the output in the western states will hardly exceed 110,000 bales. These figures indicate a shortage and higher prices than have recently prevailed.

In the Middlesex Fells and Blue Hills reservations near Boston, foxes have of late become so abundant that the question how to lessen their numbers has become a pressing one. They already do much damage in destroying the grouse, quail and other ground birds which inhabit the reservations, while no natural enemies exist to prey upon them in their turn.

Madame Gastellier, the earliest white Chrysanthemum, this season proved to be the first among all colors in this section, and flowers of this variety were sold here on September 18th. During last week there were also in trade flowers of the French variety, Marquis de Montmort, a pleasing pink resembling Viviand Morel, and of the English variety, Lady Fitz Wigram, a white sort.

Mr. E. D. Sturtevant writes us from Los Angeles, California, with reference to Dendromecon rigidum, that this plant, in California, is considered one of the finest native shrubs. The flowers are of the brightest pure yellow color, about two inches across and produced for a long period. The foliage is a peculiar grayish green, but the flowers are so beautiful that this may well be overlooked. Unfortunately, it is difficult to transplant, but if successfully moved it grows well in gardens there.

Not only has the Missouri peach crop been remarkably large this year, but all fruits have been abundantly produced in that state, and are of excellent quality. In the six leading counties in the Missouri fruit belt the acreage of bearing Peach-trees is now five thousand acres. Apples, by reason of high color, superior flavor and good shipping qualities, will command extra prices, and every variety of apple has done well. Missouri pears are selling as high as $4.00 a bushel. Colonel J. R. Rippey, secretary of the State Board of Agriculture, estimates this season's fruit crop to be worth $25,000,000. More orchards have been planted in Missouri during the past two years than in any other state, and thousands of acres are being set in Grapes.

Lima beans, from New Jersey, now sell at thirty cents a half-peck, and peas and string-beans cost forty cents for the same quantity. The best sugar corn commands fifty cents a dozen. Choice heads of cauliflower, from Long Island, cost twenty-five cents each, eggplants from ten to fifteen cents, and sweet potatoes thirty cents a half-peck. The cooler weather of the past ten days has stimulated the demand for celery, which is coming from near Rochester, in this state, and from Long Island and New Jersey. Cucumbers of uniform and desirable size, from Shelter Island, sell for five cents each; tiny cucumbers from near-by fields, for pickling, bring thirty cents a hundred, and green tomatoes, used for the same purpose, forty cents a half-peck. Small okra costs forty cents a hundred. Tomatoes, Brussels sprouts, kohl-rabi, squashes and pumpkins are fairly plentiful, and radishes, carrots, turnips, parsnips, beets, horse-radish, salsify and celeriac are among the root crops now in season.

Crisp Red Callahan apples, from New Jersey, and the soft and more showy Alexanders, from Vermont, are choice table fruits at this time. Siberian crab-apples sell at thirty-five cents, retail, in ten-pound baskets, in New York markets, and large smooth quinces, from near-by gardens, cost $2.00 a hundred. Although berries are no longer offered, a bewildering variety of fruits is still shown. On one stand in Washington Market are watermelons and muskmelons in plentiful supply at summer prices; large Japanese persimmons, from Florida; immense white Rareripe peaches, from New Jersey; nectarines, from California; fresh figs, from Virginia, in quart boxes, at twenty-five cents; Almeria grapes, from Spain, a portion of the first importation of this season; choice Black Morocco grapes, from California, nearly as large as plums, seven pounds costing sixty cents, besides Flame Tokays and other varieties from California, and Concord, Delaware and Niagara grapes, from Lake Keuka; Seckel, Bartlett and Comice pears; Green Gages, Reine Claude and Damson plums, from this state; Hungarian and Italian prunes, from Idaho, and Silver and Kelsey plums, from California; new grape-fruit from the Bahamas, and oranges from California and Italy. To this partial list of seasonable fruits must be added chestnuts, the first shipments of which reached this city on September 23d from Ridgely, Maryland, and from cultivated groves in New Jersey. These large and handsome nuts sell for thirty cents a pound. Of course, lemons, bananas and pineapples are offered here, and cocoanuts. Of this latter fruit no fewer than 421,000 were received at this port last week.

A recreation pier, the second now established in this city, was opened to the public on last Saturday, and contracts for building three more are about to be let by the Board of Dock Commissioners. The first pier, at the foot of Third Street, on the East River, has been in use since early in July, and during the summer has been visited each day by from 1,500 to 6,000 persons. The new pier at Twenty-fourth Street extends 720 feet into the East River, and on its two floors can accommodate 14,000 persons. Music is provided every evening of the week, and it is worth going a long way to see the enjoyment of the residents of these crowded sections of the city in their use of these spacious gathering places. Seats are provided along each side. Promenading and singing the choruses to the airs played by a brass band are the main pastimes, while vociferous calls for encores of specially popular songs seem to give no small satisfaction to otherwise orderly boys. To others the water view and the shores outlined with electric street lights and the colored lights on ferryboats and steamships are the greater delight. Dancing proved objectionable after a short trial, in bringing together a disorderly class of people, and is not now permitted. In addition to officers of the Dock Department, matrons, in neat uniform, are in attendance. It is the intention of the Dock Commissioners, if they can get the necessary authority, to inclose the pier in glass and have it properly heated, so that it can be used all the year through instead of during the warm months only. The Park Board now has under consideration a proposition to stock the pier with flowers and plants, and the Board of Education will be asked to provide a course of free lectures for the winter months.

Farmers' Bulletin No. 58, just published by the United States Department of Agriculture, contains information about the Soy Bean, Glycine hispida, which is of practical interest to agriculturists. This Bean, of which there are some sixty varieties, is a native of south-eastern Asia, and has been cultivated in Japan and China for many centuries. Professor Georgeson, of the Kansas Agricultural College, made some experiments with the Soy Bean as long ago as 1891 (see Garden and Forest, vol. v., page 60), and in more recent tests carried on at several of the Experiment Stations its great value as a crop in this country has been clearly proved. In Europe, where successful experiments were made in 1875 and succeeding years, it has as yet failed to become a staple crop. The plant is an erect annual, with branching, hairy stems, trifoliate, more or less hairy leaves, rather inconspicuous pale lilac or violet colored flowers, and broad, two to five seeded pods, covered with stiff reddish hairs. The seeds vary in color from whitish and yellowish to green, brown and black, and in shape from spherical to elliptical and more or less compressed. Under favorable conditions the plant may reach a height of four feet or more. In the extensive series of experiments carried on by Professor Haberlandt in Austro-Hungary, the plants each bore about 200 pods and 450 seeds, and though this is probably considerably above the average it shows this Bean to be remarkably prolific. The flowers are self-pollinated, so that the yield is entirely independent of insects, and this fact renders the Soy Bean free from an important obstacle in the way of the introduction of many legumes into new regions. A crop of seed is insured wherever conditions are such as to allow the plants to make proper vegetative growth and reach maturity. This useful bulletin includes a description of some of the best varieties, the conditions of growth, methods of culture, and chapters on the time for harvesting, amount of forage yielded, the chemical composition of the various parts used for feeding purposes, its digestibility, its value and uses as a soiling crop, a silage crop, a hay crop and as a pasture plant and soil renewer. In the latter connection it is stated that the Soy Bean is highly valued in Japan as a nitrogen gatherer, and is extensively grown there in rotation with cereal crops. When first introduced into the United States this plant did not form root tubercles, owing to the absence of the tubercle organism in the soil, and it has been grown for several years in some localities without the appearance of any tubercles. In other cases they have developed in great abundance after a short time, and an illustration of the roots of a plant grown at the Massachusetts Experiment Station show them produced in great numbers. The purpose of the bulletin is to shows the value of the Soy Bean as a forage crop, and an appendix is added by Dr. C. F. Langworthy, explaining its value as food for man.